START2

Superfund Technical Assessment and Response Team 2 - Region VIII

United States
Environmental Protection Agency

Contract No. 68-W-00-118

FIELD SAMPLING PLAN
for REMEDIAL INVESTIGATION/FEASIBILITY STUDY

VASQUEZ BOULEVARD AND I-70
City and County of Denver, Colorado

TDD No. 0305-0005

JUNE 4, 2003

START2 EPA REGION VIII
URS
OPERATING SERVICES, INC.

In association with: Tetra Tech EM, Inc.
URS Corporation
LT Environmental, Inc.
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CERCLIS ID# CO0002259588

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1.0 INTRODUCTION

The URS Operating Services, Inc. (UOS) Superfund Technical Assessment and Response Team 2 (START2) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, to conduct a residential soil sampling as part of a Remedial Investigation/Feasibility Study (RI/FS) at the Vasquez Blvd. and I-70 site (CERCLIS ID# CO0002259588) in the City and County of Denver, Colorado. Field work for this RI/FS is projected to be completed during the summer of 2003.

This Field Sampling Plan (FSP) is designed to guide field operations during the residential soil sampling, and has been prepared in accordance with Technical Direction Document (TDD) #0305-0005 and the "UOS Generic Quality Assurance Project Plan" (URS Operating Services, Inc. (UOS) 2001). The field work for this project will include the collection of surface soil samples from residential properties specified by the EPA Remedial Project Manager (RPM), Victor Ketellapper. Sampling procedures will adhere to those outlined in the UOS Technical Standard Operating Procedures (TSOPs) for field operations at hazardous waste sites and in the Project Plan for the Vasquez Boulevard and I-70 Site Phase III Field Investigation (UOS 2000; ISSI Consulting Group, Inc. 1999).

The addresses of properties to be sampled will be provided to START2 in groups of 10 to 20. Site characterization samples will include three composite surface soil samples from each residential property. Laboratory matrix spike/matrix spike duplicates (MS/MSDs) will be collected as double volume samples and will be collected at a frequency of one per twenty laboratory samples (Table 1). In addition, one rinsate blank per twenty laboratory samples will be collected to determine the completeness of field decontamination procedures. Duplicate soil samples will not be collected due to the natural heterogeneity of soils.

All samples will be analyzed for lead and arsenic through a private contracted laboratory.

2.0 OBJECTIVES

The purpose of this RI/FS field sampling event is to characterize surface soils at residential properties within the Vasquez Blvd. and I-70 site boundary.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION AND DESCRIPTION

The Vasquez Blvd. and I-70 site is located in the northern section of Denver, Colorado. The study area is bounded on the west by the South Platte River. Colorado Boulevard forms part of the site boundary on the east. Northern and southern boundaries for the study area are East 52nd Avenue and Martin Luther King Boulevard, respectively. A small area south of Globeville is also included (Figure 1). The Vasquez Blvd. and I-70 site is comprised mainly of residential neighborhoods, but also includes some areas used for commercial and industrial purposes. Two historic smelters (Omaha-Grant and Argo) were located on the site. The location of the Globe Smelter is north and west of the site (ISSI 1999).

3.2 SITE HISTORY AND PREVIOUS WORK

Investigations begun in the vicinity of the Globe Smelter revealed the presence of residential soil contamination with metals associated with historic operations of the smelter. As sampling activities were extended farther from the smelter, a number of residential properties were identified with higher than anticipated levels of metals in yard soils. The discovery of these elevated soil levels in residential areas was the basis for establishing the site (ISSI 1999).

Numerous residences have been sampled during Phase I, II, and III of the investigation at the site. This phase of the investigation is to be performed as a follow up investigation of residential properties that have not yet been sampled and whose owners desire to have their property sampled.

4.0 FIELD PROCEDURES

4.1 CONCEPT OF OPERATIONS

4.1.1 Schedule

Field work is scheduled for summer 2003. Sampling will occur periodically throughout the summer as the RPM provides START2 with the addresses of properties to be samples. Non-sampling data collection will be performed as appropriate.

4.1.2 Safety

All field activities will be conducted in strict accordance with an approved UOS Site Health and Safety Plan, which will be developed before the start of field activities. It is anticipated that all field work can be accomplished in Level D personal protective equipment.

4.1.3 Site Access and Logistics

UOS will obtain signed access agreements from the property owner prior to conducting sampling activities at that property.

4.2 SAMPLE LOCATIONS

Residential yard soil samples will be collected at all properties supplied to START2 by the RPM for which access has been granted by the property owner. Surface soil grab samples will be collected from 0 to 2 inches below ground surface (bgs) at each of thirty locations (sample points) at each residence. The soil from these thirty sample points will be combined in the field into three composite samples. Sample points will be determined in the following manner. The residential yard will be measured with a measuring tape and a sketch will be made of the property dimensions, north orientation, permanent structures, and adjacent streets and alleyways on engineering paper (paper with a grid). From this sketch, the total samplable area (all areas of the property that are free of permanent obstructions) will be determined and divided into subareas using natural boundaries such as the house or sidewalks. A minimum of three and a maximum of eight subareas will be identified.

The number of grids in each subarea and the number of grids comprising the total samplable area will be determined using the sketch. The total samplable area and the area of each subarea will be determined from the scale of the sketch and will be recorded. The total number of grids contained on the property will be divided by 30 to determine the number of grids to be represented by each sample point. The number of sample points in each subarea will be determined by dividing the number of grids in each subarea by the calculated number of grids per sample point. All sample points will be indicated on the property sketch. Sample points will be staked with three distinct flag colors (i.e., yellow, blue, and red) in a manner such that two flags of the same color are not next to each other and that flags are spaced as evenly as possible over the samplable area (Figure 2). The grab samples from the sample points with the same color flags will be combined into one composite sample.

4.3 SAMPLE LABELING

The sample points will be located on the site sketch. Composite samples will be identified based on the street address of the property sampled. A total of four fields will represent the sample identification designation.

- The first field will be the letters "VB" that designate the sampling event as Vasquez Boulevard I-70 Residential Soils.

- The second field will be four numerical digits comprised of the numeric street address.

- The third field will be comprised of two letter digits that are an acronym of the street of the property sampled.

- The fourth field will be a number from one through three that will represent the sequential number of the composite sample collected at the residential location specified in the second and third fields).

4.4 SAMPLING METHODS

Surface soil samples will be collected in accordance with procedures described in UOS TSOP 4.16, "Surface and Shallow Depth Soil Sampling" (UOS 2000). Stainless steel hand trowels and bowls will be used for soil collection. Samples will be collected as biased grab samples from the zero to two-foot depth interval. Samples from flags of the same color will be collected with a steel trowel, composited in a steel bowl and mixed to homogenize. The composite sample will then be transferred into an eight-ounce polyethylene sample jar. Samples will be cooled to 4° Celsius and placed in coolers for delivery to a privately contracted laboratory for lead and arsenic analysis.

4.5 CONTROL OF CONTAMINATED MATERIALS

Investigation-derived waste (IDW) generated during the focused SI will be handled in accordance with UOS TSOP 4.8, "Investigation Derived Waste Management," and the OERR Directive 9345.3-02, "Management of Investigation Derived Waste During Site Inspections," May 1991 (U.S. Environmental Protection Agency (EPA) 1991; UOS 2000).

4.6 ANALYTICAL PARAMETERS

Soil and Rinsate blank samples will be analyzed at a privately contracted laboratory using EPA method SW846 6010B (Table 2). In order to obtain data that is accurate to levels significantly below the site action levels of 70 parts per million (ppm) for arsenic and 400 ppm for lead, laboratory detection limits will be in the range of 1 to 5 ppm.

5.0 FIELD QUALITY CONTROL PROCEDURES

All samples will be handled and preserved as described in UOS TSOP 4.2, "Sample Containers, Preservation and Maximum Holding Times." All sampling equipment will be decontaminated prior to initial use. All non-disposable sampling equipment will be decontaminated after the collection of each composite sample (10 grab samples from the sample points identified by the same flag colors) in accordance with UOS TSOP 4.11, "Equipment Decontamination." Basic decontamination will consist of washing or brushing gross particulate off sampling equipment with distilled water and a scrub brush, followed by washing equipment

with a solution of Liquinox® and distilled water, rinsing with distilled water, rinsing with nitric acid, and finally rinsing with distilled water (UOS 2000).

The following samples will be collected to evaluate quality assurance at the site in accordance with the "UOS Generic Quality Assurance Project Plan" (Table 1) (UOS 2001):

- One rinsate blank for the soil matrix will be collected for the site;

- One double volume sample per set of 20 composite samples collected to be used for a MS/MSD.

The "UOS Generic Quality Assurance Project Plan" serves as the primary guide for the integration of QA/QC procedures for the Superfund Technical Assessment Response Team (START) contract (UOS 2001).

6.0 CHAIN OF CUSTODY

After sample collection and identification, all samples will be handled in strict accordance with the chain-of-custody protocol specified in UOS TSOP 4.3, "Chain of Custody" (UOS 2000).

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

UOS will prepare a letter report and an electronic form of sample results that includes the date sampled; analytical results; name, address and phone number of the property owner; and the address of the property sampled. Data validation will be conducted by EPA Region VIII or a UOS contracted validator.

8.0 LIST OF REFERENCES

ISSI Consulting Group, Inc. (ISSI). 1999. Project Plan for the Vasquez Boulevard and I-70 Site: Phase III Field Investigation. August 4, 1999.

U.S. Environmental Protection Agency (EPA). 1991. Office of Emergency and Remedial Response, "Management of Investigation - Derived Wastes During Site Inspections OERR 9345.3-02."

URS Operating Services, Inc. (UOS). 2000. "Technical Standard Operating Procedures for the Superfund Technical Assessment and Response Team (START), EPA Region VIII." September 2000.

URS Operating Services, Inc. (UOS). 2001. "Generic Quality Assurance Project Plan" for the Superfund Technical Assessment and Response Team 2, Region VIII. February 28, 2001.

Color Map(s)

The following pages contain color that does not appear in the scanned images.

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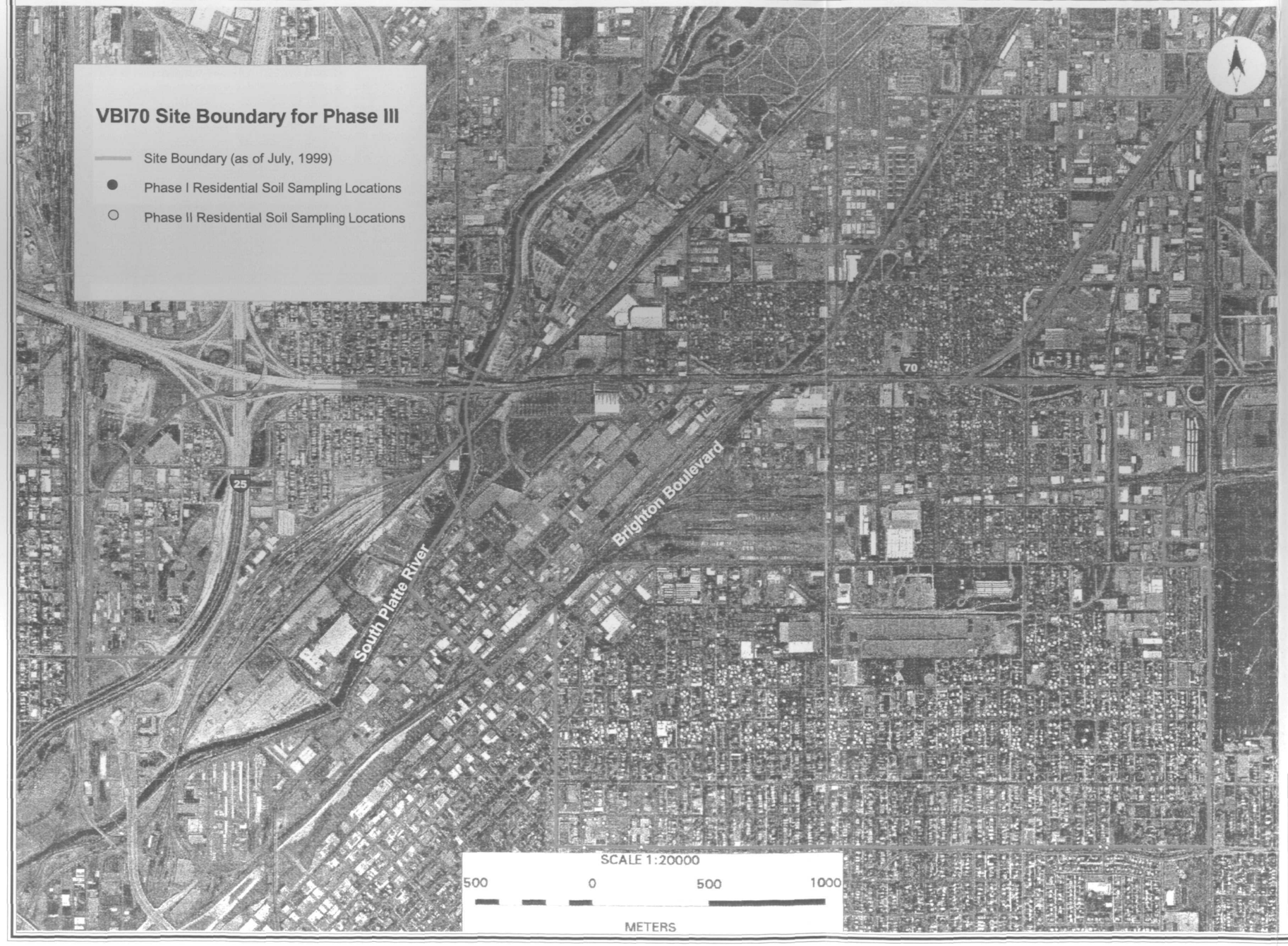

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Source: Plan for Vasquez Boulevard and I-70 Site: Phase III Investigation. ISSI Consulting Group, INC. August 4, 1999

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DENVER, COLORADO

FIGURE 1: Site Boundary Map

June 2003

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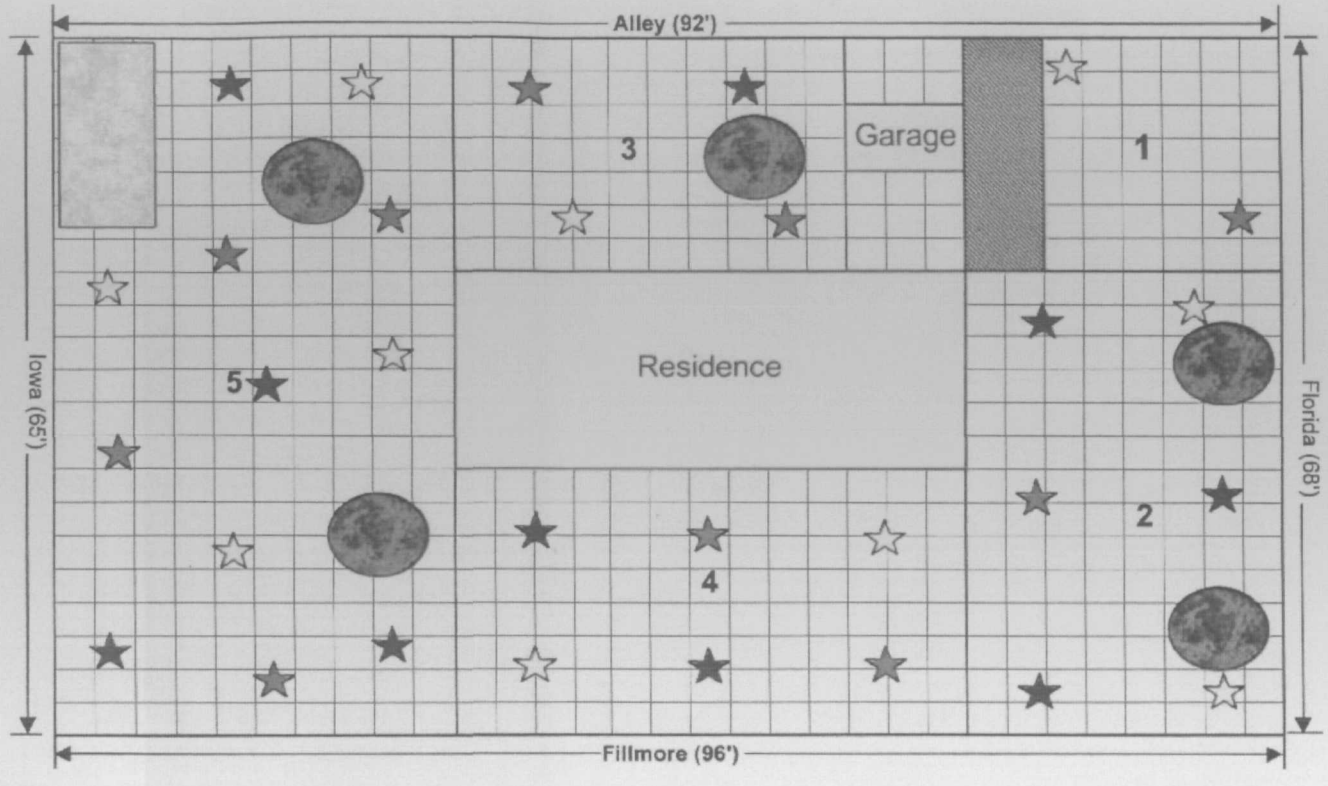
Step 2:



Tree/Shrub

Garden

Driveway

Sampling Points

Sub Area	No. of Grids	No. of Sample Points/Flags
1	42	2
2	112	6
3	70	4
4	104	6
5	210	12
Total:	538	Total: 30

Divide by 30: 17.93 Grids/Sample Point

Source: Plan for Vasquez Boulevard and I-70 Site: Phase III Investigation. ISSI Consulting Group, INC. August 4, 1999

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VASQUEZ BOULEVARD AND I-70
DENVER, COLORADO

FIGURE 2: Sampling Design

June 2003

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TDD No. 0305-0005

TABLE 1
Environmental and Quality Control Sample Quantities for Environmental Analyses

Sample Matrix	Analysis	Quality Control Samples		
		Laboratory QA/QC		Field QA/QC
		Laboratory Blank	Matrix Spike/ Matrix Spike Duplicate	Equipment Rinsate
Surface Soil	ICP	1 per 20 samples	1 per 20 samples	1 per 20 samples*

* When non-disposable sampling equipment is used
ICP Inductively coupled plasma

TABLE 2
Environmental Sample Collection and Laboratory Analysis Specifications

Analysis	Analytical Method	Reference	Container	Required Volume	Preservation	Holding Time[a]
Arsenic, Lead - ICP (Soil)	6010B	SW846	HDPE	8 ounces	N/A	6 months
Arsenic, Lead - Rinsate Blank	6010B	SW846	HDPE	1 liter	HNO_3	6 months

HDPE High-density polyethylene bottle and cap.
a Holding times begin from the time of sample collection in the field.
ICP Inductively coupled plasma.